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lead me to the conclusion that this peculiar action will always be found under the above conditions.

A further fact observed during these studies may here be noted, though not connected with the main point of this article. In many cases one or more cells in a filament may be found with two bands, while the cells on either side have only a single band (Fig. 5). The frequency of occurrence of this condition would seem to indicate that the "number of bands" in a cell is an unreliable specific character.

Notes on Umbelliferae of E. United States. VI.

JOHN M. COULTER AND J. N. ROSE.

(WITH PLATE IX.)

PIMPINELLA Linn.—Fruit oblong to ovate, flattened laterally: carpel with 5 equal slender primary ribs (sometimes almost obsolete): oil-ducts 2-6 in the intervals, 4-8 on the commissural side: seed-section somewhat dorsally flattened, the face from slightly convex to more or less concave: stylopodium cushion-like or conical (figs. 69-74).—Glabrous perennials, with ternately or pinnately compound leaves, involucre and involucels scanty or none, and white or yellow flowers.¹

1. **P. integerrima** Benth. & Hook. Gen. Pl. i. 894. Glaucous, 1-3 feet high, branching: leaves 2 to 3-ternately compound; leaflets lanceolate to ovate, entire: flowers yellow: fruit broadly oblong, 2 lines long; oil-ducts mostly 3 in the intervals, 4 on the commissural side: seed-face almost flat:

¹Our two western species are:

P. apiodora Gray, of the Pacific slope, from Northern California and Nevada to Oregon, of which no good fruit has been collected, and the very distinct new species from Southern California.

P. Parishii Smooth, erect, 1-2 ft. high, from a deep-seated fleshy root: radical and lower cauline leaves ternate, on petioles 2-4 in. long; leaflets linear-lanceolate, entire, 1-3 in. long, upper leaflet more or less distant; upper cauline leaves gradually reduced to bracts: peduncles 2-6 in. long; rays 8-10, glabrous; involucre of one or two bracts, or wanting; involucels of 2-6 linear bractlets: flowers white or pinkish: calyx-teeth prominent: fruit ovate to oblong, 1½-2 lines long; carpel with 5 slightly prominent equal ribs; oil-ducts 2-4 in the intervals, 6 on the commissural side: seed-face more or less concave: purple styles recurved in fruit, with conical stylopodia (figs. 73, 74).—Damp meadows, Bear Valley, San Bernardino Mts., California, August, 1882, *S. B. & W. F. Parish*. This is 987 Parish in part, and was detected in Mr. Martindale's collection. The original specimens under this number were collected in the San Jacinto Mts., in June, 1881, and were distributed as *Carum Gairdneri* Benth. & Hook., but are probably *C. Kelloggii* Gray. In 1882 specimens were collected in Bear Valley, San Bernardino Mts., and referred to the same number, and so distributed. All of this latter collection is the very distinct new species described above. Mr. Parish writes that the species is very abundant in Bear Valley, but is quite inaccessible, and that his specimens of it have mostly been distributed among European herbaria.

stylopodium small or wanting (figs. 69, 70). *Zizia integerrima* DC.—Rocky hillsides throughout our range. Fl. May.

2. *P. Saxifraga* L. var. *major* Koch. Leaves simply pinnate, with sharply-toothed leaflets: fruit oblong, about a line long, ribs sometimes almost obsolete; oil-ducts 2-3 in the intervals, 4 on the commissural side: seed-face somewhat convex; stylopodium cushion-like (figs. 71, 72).—Along rocky shores of the Delaware river and roadsides near Easton. Pennsylvania, *Thos. C. Porter*. Fl. July to September. This European species has been collected by Prof. Porter since 1877, and is reported by him as well established.

EULOPHUS Nutt.²—Fruit ovate, flattened laterally: carpel with five equal slender primary ribs (sometimes very indistinct): oil-ducts large, almost contiguous, mostly 3 in the intervals, 4 on the commissural side: seed-section dorsally flattened, with concave face: stylopodium thick conical (figs. 75, 76). Glabrous perennial from fleshy fascicled roots, with ternately or pinnately compound leaves, involucre and involucels scanty or none, and white flowers.

1. *E. Americanus* Nutt. DC. Mem. Umbel. 69, t. 2. Branching, 3 to 5 feet high: radical and lower cauline leaves large, 1-2-pinnately compound, with leaflets cut into short narrow segments; upper cauline leaves ternate, with long linear entire segments: calyx-teeth prominent: fruit 2-3 lines long (figs. 75, 76).—Ohio to Illinois and Arkansas.

The close relationship between *Pimpinella* and *Eulophus* (as here defined) is very evident. The character of deeply sulcate seed apparently fails in *E. Americanus*, as testified by a very large collection of well-matured fruit from Mr. Bebb's herbarium, which apparently has also supplied many other herbaria. The fruit from the Harvard Herbarium is not perfectly mature, and hence the concave face in a few cases seems slightly sulcate, but the ordinary section of the mature seed is as shown in figure 76, with concave face much as in certain species of *Pimpinella*. In the western species there is a remarkably deep sulcation, but *E. Americanus* seems to be most unnaturally allied with them, not only in fruit characters, but in vegetative characters as well. How it is to be separated in generic characters from *Pimpinella* is what we have been unable to discover, but for the present we have retained the old name.

² This generic description is based on *E. Americanus*, as the western species (*E. peucedanoides* and *E. Texanus*) differ in certain important characters.

BUPLEURUM Linn.—Fruit oblong, flattened laterally : carpel with 5 equal very slender primary ribs : oil-ducts present or (in ours) wanting : seed-section dorsally flattened, with face broadly sulcate : stylopodium flat (figs. 77, 78). Plant with simple entire ovate perfoliate leaves, no involucre, involucels of 5 ovate leaflets, and yellow flowers.

1. **B. rotundifolium** L³.—Introduced from Europe into fields and cultivated ground, New York to North Carolina and Tennessee.

CHÆROPHYLLUM Linn.—Fruit narrowly oblong to linear, notched at base, flattened laterally, with short beak or none : carpel with 5 equal primary ribs, each of which is subtended by a large group of strengthening cells usually occupying the whole thickness of the thick pericarp : oil-ducts small, mostly single in the intervals, two on the commissural side : seed with more or less deeply sulcate face : styles short (figs. 79–84).—Annuals in moist ground, with ternately decompound leaves, lobed or toothed leaflets, usually no involucre, many-leaved involucels, and white flowers.

1. **C. procumbens** Crantz, Umbel. 77. More or less hairy : stems slender, spreading, 6 to 18 inches high : fruit (in the type) narrowly oblong, glabrous, contracted but not tapering at the summit ; intervals broader than the ribs : seed-face deeply sulcate (figs. 79, 80).—New Jersey to Iowa and southward to North Carolina and Mississippi. We consider this polymorphous species to include all our forms of *Chærophylum*. The only characters that can be used to separate them specifically must be drawn from the beaking of the fruit, the size of the ribs, and the depth of the sulcus in the seed-face. Isolated specimens can be selected which seem distinct enough in these particulars, but a study of a great number of specimens from all regions shows an inextricable running together, and it seems impossible to draw specific lines. Characters that have been used to define species are found displayed on the same plant. Owing to intergrading forms even varieties can not in all cases be distinctly set apart, but the following extreme forms may, in most cases, be distinguished from the specific type by means of mature fruit :

Var. **Shortii** Torr. & Gray, Fl. 1. 637, has more broadly oblong to ovate fruit, not at all contracted at the summit (fig. 81 ; section as in fig. 80).—Kentucky to Louisiana.

³ *B. protractum* Link, which differs from *B. rotundifolium* chiefly in its tuberculate fruit, has been collected on ballast ground by Mr. Martindale.

Var. *Tainturieri* has fruit tapering at the summit or beaked, ribs very prominent and much broader than the intervals, and seed-face with a shallower sulcus (figs. 82, 83). *C. Tainturieri* Hook.—From Florida to Texas.

Var. *dasycarpum* differs from the preceding variety in having pubescent fruit, with ribs prominent but narrower than the intervals (fig. 84; surface outline as in fig. 82). *C. Tainturieri* var. *dasycarpum* Hook.—Texas. This is Hall's 260, "pubescent form," and Lindheimer's 616.

ANTHRISCUS Hoffm.⁴—Fruit linear, notched at base, flattened laterally, long beaked (in ours): carpel without ribs, but beak ribbed: thin pericarp with no strengthening cells nor oil-ducts: seed with sulcate face (figs. 85, 86).—Resembling *Chærophyllum* in vegetative characters.

1. *A. Cerefolium* Hoffm.—Mature fruit smooth and shining. *Chærophyllum sativum* L.—Naturalized in Eastern Pennsylvania, *Thos. C. Porter*.

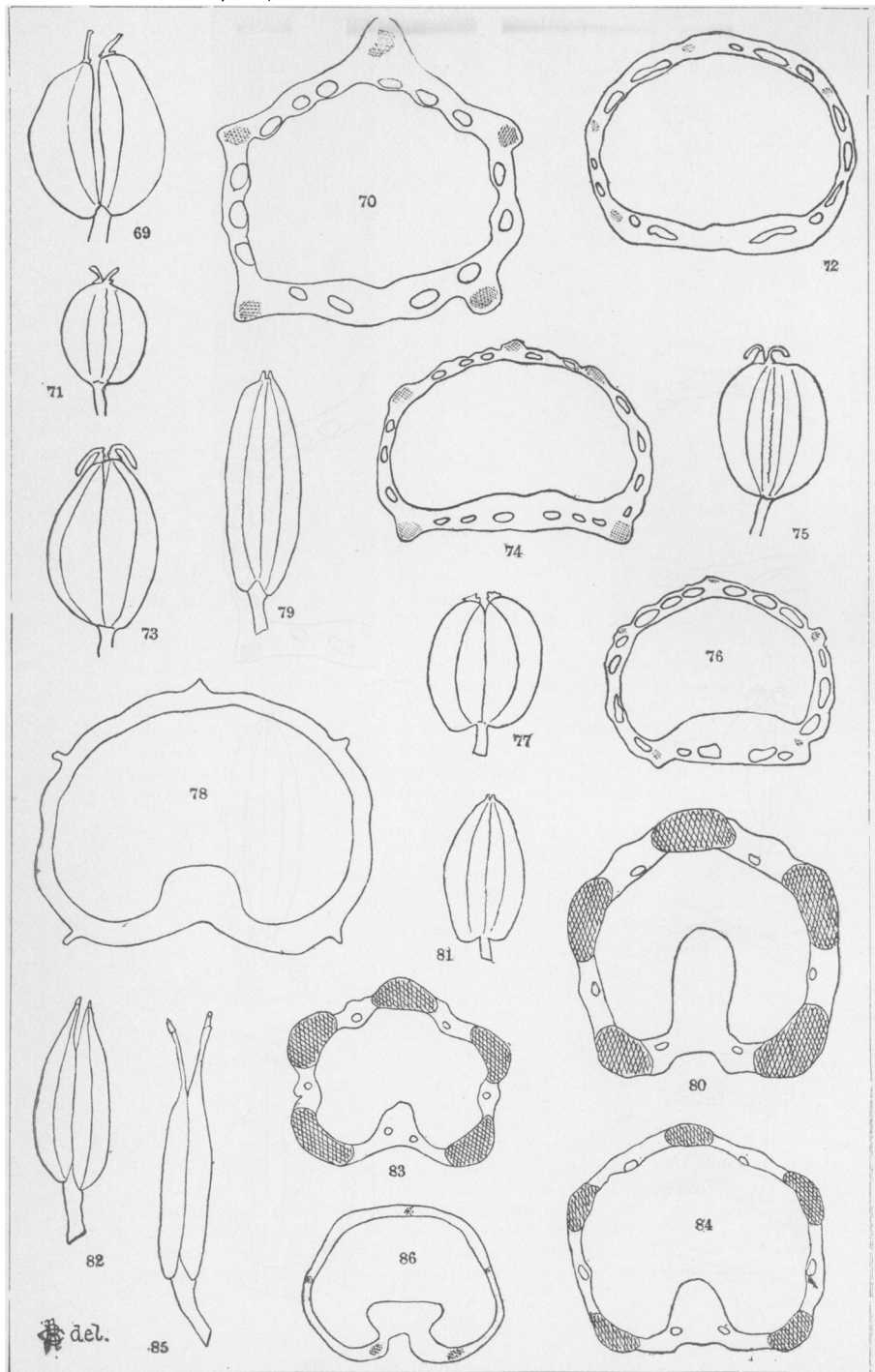
EXPLANATION OF PLATE IX.—Fig. 69, fruit of *Pimpinella integerrima*; fig. 70, section of carpel of same; fig. 71, fruit of *P. Saxifraga*, var. *major*; fig. 72, section of carpel of same; fig. 73, fruit of *P. Parishii*; fig. 74, section of carpel of same; fig. 75, fruit of *Eulophus Americanus*; fig. 76, section of carpel of same; fig. 77, fruit of *Bupleurum rotundifolium*; fig. 78, section of carpel of same; fig. 79, fruit of *Chærophyllum procumbens*; fig. 80, section of carpel of same; fig. 81, fruit of *C. procumbens*, var. *Shortii*; fig. 82, fruit of *C. procumbens* var. *Tainturieri*; fig. 83, section of carpel of same; fig. 84, section of carpel of *C. procumbens* var. *dasycarpum*; fig. 85, fruit of *Anthriscus Cerefolium*; fig. 86, section of carpel of same. Figs. 75, 79, 81, 82 are $\times 4$; figs. 69, 71, 73, 77 are $\times 7$; fig. 76 is $\times 20$; figs. 70, 72, 74, 76, 78, 80, 83, 84 are $\times 36$.

BRIEFER ARTICLES.

Fasciation in *Sophora secundiflora* (with plate X).—Dr. A. Schlottman, of Round Top, Tex., several years ago, sent me specimens of a curious form of fasciation in *Sophora secundiflora* Lag. (*S. speciosa* Benth.) It is an evergreen shrub or small tree indigenous to Texas. The specimens alluded to are from a tree which Dr. S. has in his garden, and which annually produces peculiar deformity of the flowering branches or racemes.

The extremity of the twigs, or racemes, become flattened and enlarged, gradually expanding and dividing toward the apex—sometimes in a few, often into a large number of segments—the surface studded with small scales and mostly dormant buds. Sometimes, however, these buds

⁴ *A. sylvestris* Hoffm. has been collected by Mr. Martindale on ballast ground.



COULTER and ROSE on UMBELLIFERÆ.